December 11, 2003

Mr. Lew W. Myers
Chief Operating Officer
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
5501 North State Route 2
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SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1 - REQUEST FOR ADDITIONAL INFORMATION RE: 2002 STEAM GENERATOR TUBE INSERVICE INSPECTION RESULTS (TAC NO. MB9541)

Dear Mr. Myers:

By letters dated March 22, 2002, and March 31, 2003, FirstEnergy Nuclear Operating Company provided a summary of your 2002 steam generator tube inservice inspection. By letter dated September 23, 2003, the Nuclear Regulatory Commission staff requested additional information concerning the inspection. You responded to that request by letter dated November 3, 2003. Based on the staff's review of the information provided, the staff has additional questions.

The enclosed questions were provided to your staff on December 4, 2003, and the questions were discussed with members of your staff on that date. It is our understanding that certain questions will be responded to this month with the remaining response provided to support an anticipated license amendment application. If our understanding is not correct, please contact me at (301) 415-3027 at the earliest opportunity.

Sincerely,

***/RA/***

Jon B. Hopkins, Sr. Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure: Request for Additional Information

cc w/enclosure: See next page

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REQUEST FOR ADDITIONAL INFORMATION

DAVIS-BESSE NUCLEAR POWER STATION 2002 STEAM GENERATOR TUBE

INSERVICE INSPECTION

TAC NO. MB9541

1. Regarding the inspection of the peripheral tubes to inspect for changes in the gap between the tubes and the secured auxiliary feedwater (AFW) header to verify that the header has not moved, it was indicated that 100 percent of the inservice periphery tubes were inspected. In addition, it was indicated that gap measurements were made for several AFW header indications.

   Discuss how many tubes in each steam generator were examined as part of this inspection. Please discuss when a gap measurement is made for these tubes. Discuss in detail how it was verified that the AFW header has not moved. For example, were the 2002 gap measurements compared to the gap measurements taken when the AFW header was secured? Discuss the basis for the 0.250-inch criteria mentioned in your November 3, 2003 letter. Discuss the results of the visual inspection (visual inspection required per technical specification 4.4.5.8) of the AFW header.

   It was indicated that two tubes were plugged as a result of dents associated with the AFW header. Clarify when these dents were identified and whether they have changed in size with time. If they have changed with time, discuss what impact, if any, it has on your assessments that verify the AFW header has not moved in operation. Discuss the causal mechanism for the denting.

2. It was stated that no fatigue degradation was discovered in either steam generator during the 2002 refueling outage in the one row of unsleeved tubes bordering the sleeved portion of the lane/wedge region (i.e., the sleeve border locations).

   Clarify how the determination was made that no fatigue degradation was present. For example, was it based on not detecting any degradation in these tubes or was it based on not detecting any circumferential indications in these tubes? If circumferential indications were found in these tubes, discuss how it was determined that these circumferential indications were not induced by fatigue.

3. It was indicated that approximately 60 percent of the roll expansions in the upper tubesheet were examined with a rotating probe (+Point™ and pancake coil) during the 2002 outage. Given that crack indications were detected in this region, it is not clear why the sample was not expanded to include 100 percent of the tubes in this region. The staff notes that industry guidance (Electric Power Research Institute (EPRI) Pressurized-Water Reactor (PWR) Steam Generator Inspection Guidelines) would require expansion of the initial sample to include all of the roll expansions and tube ends in the upper tubesheet upon the detection of a single crack.

ENCLOSURE

Provide the technical basis for not inspecting the upper tubesheet roll expansions and tube ends for 100 percent of the tubes. Discuss the methodology (and technical basis) for addressing the structural and leakage integrity for degradation that could be occurring in this region of the tube given that approximately 40 percent of the roll expansions and tube ends in the upper tubesheet were not inspected during the 2002 outage.

4. Recently, a couple of plants have detected tube end cracking in the lower tubesheet region. Address the methodology (and technical basis) for addressing the structural and leakage integrity for degradation that could be occurring in this region of the tube given that the roll expansions and tube ends of only a limited number of tubes were inspected in the lower tubesheet with a rotating probe during the 2002 outage.

5. A volumetric indication was located in the crevice between the tube and the upper tubesheet just below the roll transition.

   Clarify the nature of this indication (e.g., initiated from the inside diameter of the tube). Provide an assessment of whether similar indications could be located in other tubes given that this indication appears to have been detected only with a rotating probe and 100 percent of the tubes were not examined. If similar indications can not be ruled out, provide the methodology (and technical basis) for addressing the structural and leakage integrity for degradation that could be occurring in this region of the tube.

6. An examination of dents at or above the 14$^{th}$ tube support plate revealed 18 new and repeat dents in SG 2-A and 21 new and repeat dents in SG 1-B.

   Clarify how many of these dents were new (reported for the first time)? If these dents are not traceable back to the preservice inspection, discuss what affect this active denting mechanism could have on tube integrity for the period of time between inspections.

7. One tube (A-105-1) with a dent indication below the dent reporting threshold of 2.5 volts had a non-quantifiable indication (NQI). This NQI was detected with a bobbin probe and was located at or above the 14$^{th}$ tube support. Further examination of this indication with a +Point$^{TM}$ probe revealed that the indication was a circumferential primary water stress corrosion cracking indication. If the indication was truly circumferential, it is not clear why the bobbin probe detected the indication.

   Clarify whether the NQI was a result of the circumferential indication or some other anomaly (e.g., did the circumferential indication have some axial extent)? In addition, since it is very difficult to detect circumferential indications using a bobbin probe, discuss whether similar circumferential indications (which may or may not have been detected with a bobbin probe) could exist at dents that were not examined with a rotating probe.

8. A number of tubes with volumetric indications attributed to intergranular attack were plugged. Several of these indications were near 60 percent through-wall.

   Discuss the growth rate for these indications and discuss whether an increase in growth rate has been occurring with time (if a growth rate can not be established, discuss whether the maximum and/or average depths observed during an outage has been increasing with time). If the growth rate (or maximum and average depths of the

population of indications) has been increasing, discuss the implications to your tube integrity assessments.

9. It was indicated that 3 of the 194 dents in SG 1-B were identified with the pancake coil.

   Please discuss why these dents (presumably greater than 2.5 volts as determined by the bobbin coil) were not identified during the original bobbin screening. Also, discuss the implications of not finding these dents with the bobbin coil given that cracking has occurred at dents.

10. For the dents not examined during the 2002 outage, please describe the methodology used to assess the integrity of these tubes for the period of time between inspections. Include in this response, the size distribution of the dents not inspected and an assessment of whether the bobbin would have detected axial and circumferential cracks at these locations (given the size of the dent).

11. It was reported that an exception was taken against one specific element of the EPRI PWR Steam Generator Examination Guidelines that requires the number of reported false calls be no more that 10 percent of the total number of unflawed grading units when grading a Qualified Data Analyst test. The licensee stated that not imposing the false call criteria assures a higher probability of detection, which should result in a more conservative position, thereby assuring a safe and reliable inspection process.

    It appears to the Nuclear Regulatory Commission staff that this would be true, provided the false call rate made during analysis of the field eddy current data was the same or higher than the false call rate made during the qualification test (i.e., to avoid an analyst making numerous false calls during the qualification test simply to pass the test).

    Discuss what measures, if any, were taken to verify that the false call rate in the field were consistently higher than the false call rate made during the qualification test. In other words, explain why excluding the false call criteria assures a higher probability of detection for the individual qualified data analysts.

12. It was indicated that the plant deviated from the portion of the EPRI guidelines dealing with chemical excursions that exceeded Action Level 3 limits.

    Discuss whether this deviation was in effect prior to the 2002 outage and whether it currently is in effect. Discuss the corrective actions taken to minimize the potential to exceed the Action Level 3 limits. In addition, provide the technical basis demonstrating that the process followed when Action Level 3 limits are exceeded at Davis-Besse is the best course of action. Also, discuss why this is not recognized by the industry guidelines (i.e., is the phenomenon observed at Davis-Besse unique).

13. It was indicated that there were no confirmed loose part indications detected by eddy current. Clarify what is meant by “confirmed.” For example, is it referring to visual confirmation of the indication? Discuss whether any possible loose parts were detected during the eddy current examination.